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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/635,435	08/07/2003	Peter Gaines Cleveland	839-1466	8546

30024 7590 12/03/2004  
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EXAMINER

EDGAR, RICHARD A

ART UNIT PAPER NUMBER

3745

DATE MAILED: 12/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/635,435	<b>Applicant(s)</b> CLEVELAND ET AL.	
	<b>Examiner</b> Richard Edgar	<b>Art Unit</b> 3745	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

## DETAILED ACTION

### *Specification*

The disclosure is objected to because of the following informalities:

In paragraph [0005], the serial number 10/616,911 should be placed in the underlined section along with -- U.S. Patent No. 6,769,879 --.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3-6, 9-15 and 17-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 recites the limitation " certain of said holes " in line 1. There is insufficient antecedent basis for this limitation in the claim. Note that claim 1 only recites a first hole, a second hole and a plurality of intermediate holes.

Claim 9 recites coordinate values found in Table I for a particular span location and particular holes. The data in Table I is definite, however, the way Applicant has picked particular portions and recited only those in the claim, render the claim indefinite. For example, hole H15 is not mentioned in the claim but is evident in the table. Also, there are more span locations than just 5% shown in the table. The claim is indefinite, since one cannot determine if Applicant is claiming less than that shown in Table I. The examiner suggests having separate tables for each claim Applicant seeks patent

protection, thereby clearly defining the invention. Note that incorporation of a table into a claim is not for Applicant's convenience (MPEP §2173.05(s)).

Similarly, claims 10-15 and 17-23, seem to pick and choose certain values from Table I, rendering those claims indefinite.

Claims 4-6 depend from indefinite claim 3, and are therefore indefinite themselves.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 7, 8 and as far as claims 3-6 are definite, are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 5,980,209 (Barry et al. hereinafter) in view of United States Patent No. 6,382,914 (Tressler hereinafter).

Barry et al. show an air-cooled bucket for a turbine comprising an airfoil section having a plurality of cooling holes 24 extending between root 25 and tip 26 portions of the airfoil with the holes exiting at the tip of the airfoil, the holes including at least a first hole adjacent a leading edge L.E., at least a second hole adjacent a trailing edge T.E. and a plurality of holes intermediate the leading and trailing edge holes, the plurality of intermediate holes including holes spaced from one another on opposite sides of a mean camber line between the leading and trailing edges wherein the plurality of

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cooling holes form a generally airfoil-shaped envelope within the airfoil section (see Fig. 3).

Since the airfoil is shown in Fig. 6 being twisted, and the cross sections of Fig. 3 and Fig. 4 each have cooling holes at similar locations relative to the airfoil surface, the leading and trailing edge holes must be canted relative to the intermediate holes.

Fig. 8 shows that some of the holes have turbulators therein.

Fig. 7 shows that the flange portion of the airfoil tip has an opening along the suction side.

Figs. 3 and 4 each show the circular cross-section shape of the holes along the airfoil span.

Barry et al. do not show the cross-section of the cooling holes decreasing from the leading edge to the trailing edge.

Tressler shows a turbine blade having cooling holes 22, 32, 34, 36, 38, 40 arranged from a leading edge 26 to a trailing edge 28, wherein the diameter of the holes decreases along the chord (see Abstract and col. 3, lines 20-34) for the purpose of maximizing the volume of the holes in the cross-section of the airfoil.

Since Barry et al. show cooling holes in a turbine blade and Tressler teaches that cooling holes in a turbine blade should be larger at the leading edge and small towards the trailing edge, it would have been obvious at the time the invention was made to a

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person having ordinary skill in the art to modify the diameters of the Barry et al. blade as taught by Tressler for the purpose of maximizing the volume of the holes in the cross-section of the airfoil.

Claims 9-15 and 17-23, as far as they are definite, are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 5,980,209 (Barry et al. hereinafter).

Barry et al. disclose a turbine bucket having a plurality of cooling holes 24 extending between root and tip portions, wherein first and second holes are adjacent the leading L.E. and trailing edges T.E., respectively, and intermediate holes are arranged therebetween, wherein the intermediate holes form a generally airfoil-shaped envelope (see Fig. 3). Barry et al. do not give the specific Cartesian coordinates of the holes along specific span locations, nor the hole diameters. Further, the blade shape is not defined with Cartesian coordinates.

At the time the invention was made, it would have been an obvious matter of design choice to a person of ordinary skill in the art to manufacture the cooling holes with the coordinates and diameters given in Table I and the blade shape with the coordinates given in Table II because Applicants have not disclosed that the specific arrangement and size of the cooling holes and shape of the blade, provide an advantage, are used for a particular purpose, or solve a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicants' invention to perform equally well with other coordinates and hole diameters, as well as blade shape,

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since the design of cooling holes and airfoils, in turbine blades is application specific.

The optimal coordinates and hole diameters of a specific blade would be systematically determined after knowing at least the operating temperature of the blade and the pressures in the gas flow path and the cooling flow path.

Therefore, it would have been an obvious matter of design choice to modify Barry et al. to obtain the invention as specified in claims 9-15 and 17-23.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 5,980,209 (Barry et al. hereinafter) as applied to claims 9-15 and 17-23 above, and further in view of United States Patent No. 6,382,914 (Tressler hereinafter).

The Barry et al. reference modified by design shows a turbine blade with cooling holes therein which is made to be a specific shape and have specific coordinates, respectively, but does not show the diameters of the cooling holes decreasing along the chord, leading edge to trailing edge.

Tressler shows a turbine blade having cooling holes 22, 32, 34, 36, 38, 40 arranged from a leading edge 26 to a trailing edge 28, wherein the diameter of the holes decreases along the chord for the purpose of maximizing the volume of the holes in the cross-section of the airfoil.

Since the modified Barry et al. shows cooling holes in a turbine blade and Tressler teaches that cooling holes in a turbine blade should be larger at the leading edge and small towards the trailing edge, it would have been obvious at the time the

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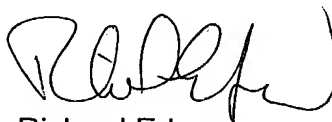
invention was made to a person having ordinary skill in the art to shape the diameters of the modified Barry et al. blade as taught by Tressler for the purpose of maximizing the volume of the holes in the cross-section of the airfoil.

**Contact Information**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Edgar whose telephone number is (571) 272-4816. The examiner can normally be reached on Monday thru Friday, 8:00 am until 4:00 pm EST.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Richard Edgar  
Examiner  
Art Unit 3745

RE



F. DANIEL LOPEZ  
PRIMARY EXAMINER